

MFM2P

Lesson 1.7a: Writing an Equation Given the Slope and a Point

A linear equation in slope and y-intercept form is: _____

where the slope is: _____

and y-intercept is: _____

Example 1

Find the equation of the line with a slope of -4 that passes through the point $(1, -7)$.
 (x, y)

Steps

1. Write the slope and y-intercept equation.
2. Replace the " m " value with the given value of the slope.
3. Replace the " x " and " y " with the x and y coordinates of the given point.
4. Solve for " b ".
5. Replace the " b " with the value found in step 4.

Example 2

Find the equation of the line with a slope of $\frac{1}{2}$ that passes through the point $(-6, -8)$.

Practice

Write the linear equation in slope and y-intercept form given the slope and point that is on the line.

a) slope = 7 , point $(-2, 5)$

b) slope = -2 , point $(4, -3)$

c) slope = $-\frac{1}{3}$, point $(-9, 1)$

d) slope = 8 , point $(-6, -4)$

e) slope = $\frac{3}{4}$, point $(8, -10)$

f) slope = -3 , point $(-3, 2)$

Answers: a) $y = 7x + 19$

b) $y = -2x + 5$

c) $y = -\frac{1}{3}x - 2$

d) $y = 8x + 44$

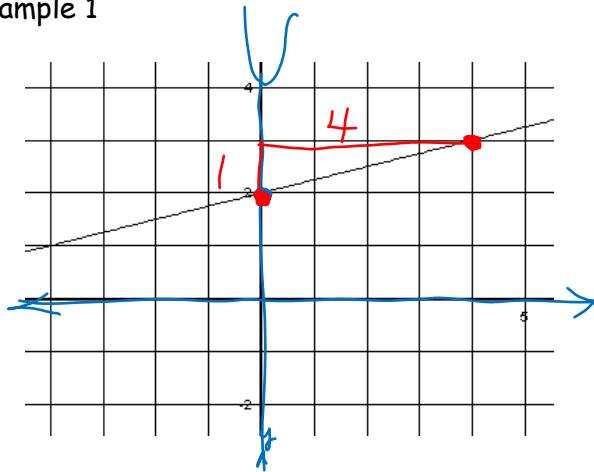
e) $y = \frac{3}{4}x - 16$

f) $y = -3x - 7$

Lesson 3.7b: Finding the Equation of a Line Part II

2) Given a graph: Find the equation of the line.

Example 1



Steps

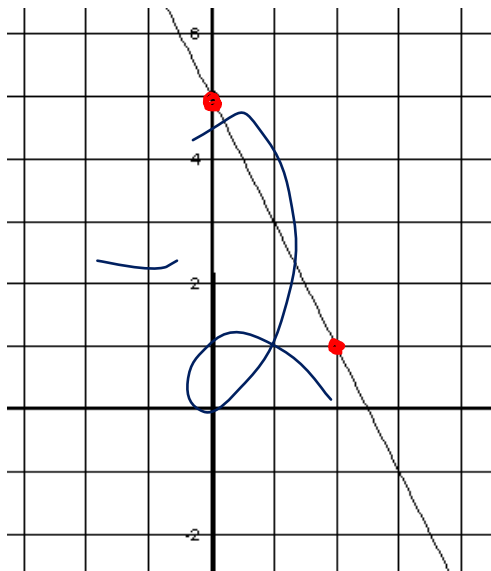
1. Write the slope / y-intercept equation.
2. Replace the " b " value with the given value of the y-intercept.
3. Find the "slope" by counting off the grid or by using $\frac{\Delta y}{\Delta x} = \frac{1}{4}$
4. Replace the " m " with the value found in step 3.

$$y = \underline{m}x + \underline{b}$$

$$y = \underline{m}x + \underline{2}$$

$$y = \frac{1}{4}x + 2$$

Example 2



$$y = mx + b$$

$$y = -\frac{4}{2}x + 5$$

3) Given two points on the line:

Example 3

Find the equation of a line that passes through the points $(20, 138)$ and $(45, 123)$

(x_1, y_1)

(x_2, y_2)

Steps

1. Write the slope / y-intercept equation.
2. Find the slope.
3. Replace the "m" with the value found in step 2.
4. Replace the "x" and "y" with the x and y coordinates of ANY given point.
5. Solve for "b".
6. Replace the "b" with the value found in step 5.

① $y = mx + b$

③ $y = -\frac{3}{5}x + b$

② $m = \frac{y_2 - y_1}{x_2 - x_1}$

$= \frac{123 - (138)}{45 - (20)}$

$= \frac{-15}{25}$

$= -\frac{3}{5}$

$123 = -\frac{3}{5}(45) + b$

$123 = -\frac{135}{5} + b$

$123 = -27 + b$

$123 + 27 = b$

$b = 150$

∴ the equation is

$y = -\frac{3}{5}x + 150$

Example 4

Find the equation of a line that passes through the points $(-1, 4)$ and $(5, 13)$.

~~$(-1, 4)$~~ b

$=$

$m = \frac{13 - (4)}{5 - (-1)}$

$\frac{5 - (-1)}{13 - 4} = \frac{6}{9} = \frac{2}{3}$

$y = \frac{2}{3}x + b$

$13 = \frac{15}{2} + b$

$13 = 7.5 + b$

$13 - 7.5 = b$

$5.5 = b$

∴ the equation of the line is $y = \frac{2}{3}x + 5.5$